

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
13 January 2005 (13.01.2005)

PCT

(10) International Publication Number
WO 2005/003532 A1

(51) International Patent Classification⁷: **F02B 25/08**

(21) International Application Number:
PCT/US2004/020590

(22) International Filing Date: 25 June 2004 (25.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/482,772 25 June 2003 (25.06.2003) US

(71) Applicant: **ADVANCED PROPULSION TECHNOLOGIES, INC.** [US/US]; 69 Santa Felicia Drive, Goleta, CA 93117 (US).

(71) Applicants and

(72) Inventors: **HOFBAUER, Peter** [AT/US]; 3820 Pine Lake Knoll Drive, West Bloomfield, MI 48324 (US).
TUSINEAN, Adrian [CA/CA]; 1328 Copperfield PL, Windsor, OT N8S-4G9 (CA).

(74) Agents: **FORDENBACHER, Paul J.** et al.; Ganz Law, P.C., P.O. Box 10105, Portland, OR 97296 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

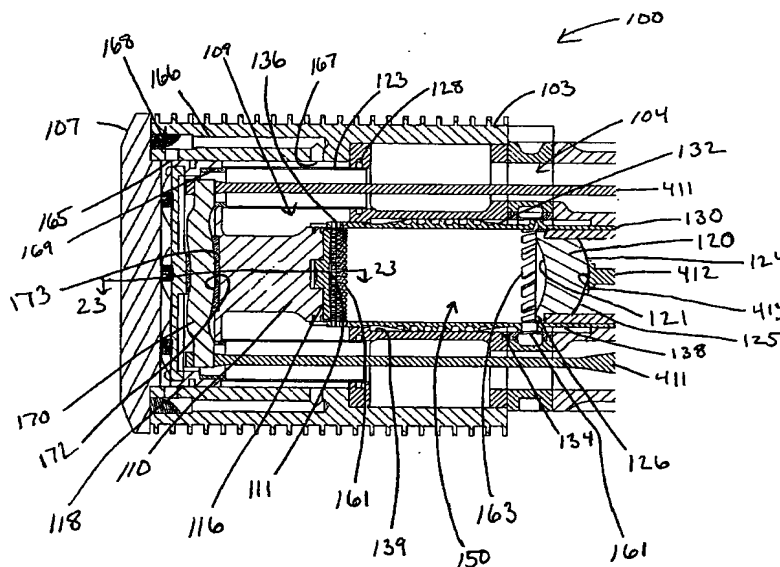
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **INTERNAL COMBUSTION ENGINE**



(57) Abstract: A two-stroke internal combustion engine is disclosed having opposed cylinders, each cylinder having a pair of opposed pistons, with all the pistons connected to a common central crankshaft. The inboard pistons of each cylinder are connected to the crankshaft with pushrods and the outboard pistons are connected to the crankshaft with pullrods. Each opposed cylinder further comprises an integrated scavange pump for providing positive intake pressure. This configuration results in a compact engine with a very low profile, in which the free mass forces can be substantially balanced. The engine configuration also allows for asymmetrical timing of the intake and exhaust ports through angular positioning of the journals on the crankshaft.